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ABSTRACT

A preliminary study investigated the value of the Dynamic Assessment Procedure (DAP) for understanding reading behaviors of at-risk high-school-age students. The study also sought to determine teacher interest in and ability to use the DAP information to develop instructional plans. Subjects, 19 students with reading difficulties enrolled in 1 public and 2 private suburban high schools, were administered the following components of the DAP: initial assessment of reading ability; analysis of reading process and strategy utilization; presentation of a mediated learning lesson using direct instruction, guided practice, and independent practice; and posttests of the reader's ability to benefit from presentation of newly introduced strategies. Two case studies of individual subjects' behaviors and responses to the DAP illustrated more clearly its use and benefits than did the quantitative analyses. Results of the quantitative analysis indicated that the DAP is particularly valuable for at-risk readers because it provides a means of understanding readers' strengths, weaknesses, preferred strategies, and ability to accept and supply new strategies. Results also indicated that the teachers were able to use the strategy information to identify which strategies to teach and to use the behavioral information to guide their work with particular students. (One table indicating a strategy classification scheme and one table of data are included; 40 references are attached.) (RS)

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DYNAMIC ASSESSMENT PROCEDURE:

A VALIDATION

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Dynamic Assessment Procedure for Reading: A Validation

During the last decade, reading has been perceived holistically as a problem-solving, meaning constructing activity with a variety of strategies available to the reader. Effective reading results from the reader's active construction of meaning using these strategies. Reading comprehension is dynamic, a constantly changing construct in the mind of the reader, dependent upon the interaction of reader characteristics, text characteristics, the purpose of the reading, the context, and the reader's strategy knowledge. This view of strategic, interactive reading has important implications for assessment.

During the same time period, cognitive psychologists have become increasingly aware of the deficiencies of traditional models of assessment -- static measurements of an individual's independent intellectual abilities. This dissatisfaction with the standard model has resulted in researchers' examining means of evaluating learning behaviors through interactive testing procedures. The Dynamic Assessment Procedure (DAP) for reading, described in this article, was developed from these two theoretical strands.

This article will present a brief summary of the concept of strategic reading and of dynamic assessment. It will describe the DAP and give results of a preliminary study using it with high school age readers.

Strategic Reading

Strategies are actions, either conscious or automatic, which readers use to comprehend. The conscious use of reading strategies implies an intentional selection of a means to understanding (Paris, Lipson, & Wixson, 1983). Automatic use comes from repeated practice of these reading strategies in different contexts until a reader is able to utilize them without conscious effort. Comprehension monitoring, an awareness of how understanding is progressing, is crucial for the reader to be aware that an automatic strategy is not sufficient and that conscious effort is required.

Most research studies examining differences between good and poor (or expert and novice) readers' strategy knowledge indicate that strategy knowledge tends to be developmental with older readers more aware of available strategies (Baker & Brown, 1984; Moore & Kirby, 1981; Myers & Paris, 1978). Better readers tend to use strategies more flexibly, matching strategy use to task demands (Kletzien, in press; Hare & Pulliam, 1980; Paris & Myers, 1981; Smith, 1967; Spiro & Meyers, 1984). Interestingly, strategy use appears to decline for many readers as reading material becomes more difficult (Bednar, 1987; Kletzien, in press; Olshavsky, 1978).

Traditional reading assessment needs to be redesigned to reflect this current interactive view of reading (Valencia & Pearson, 1987). Recent assessment approaches, such as the state-wide standardized tests in Michigan and Illinois (Wixson, Peters, Weber, & Roeber, 1987), end of unit tests in some basal series, and clinical procedures (Paratore & Indrisano, 1987), have been designed to evaluate reader processes and strategy use. School-based, individual assessment techniques are also changing to reflect this interactive, strategic view of reading (Brozo, 1990; Ellis, 1989; Kletzien & Bednar, 1990).

Assessing knowledge and use of reading strategies, largely ignored by traditional individual assessment methods, is essential for understanding a reader and developing an instructional program. Assessment, however, should be more than a mere listing of strategy knowledge and use;

it should also include information about the reader's openness to instruction, capability to learn and use new strategies, and flexibility in meeting varying task demands.

Dynamic Assessment

Dynamic assessment, a relatively new approach, provides data about an individual's cognitive strategies and responsiveness to instruction, and information about what kinds of instruction might be valuable for the individual. Any type of dynamic assessment includes a session of instruction. Typically, an individual is pretested on a task, is given instruction about how to do the task, and then is post-tested on the task.

Proponents of dynamic assessment have been influenced by Vygotsky's general view of learning and development. Vygotsky (1978) suggested that assessment should look beyond the individual's obvious abilities and focus upon the possible range of capabilities, the zone of proximal development. This zone reflects the individual's talents that have not yet matured but are in the process of "budding." According to Vygotsky, an individual grows as a learner through interaction with others. This receptivity and ability to learn with the help of others should be included when assessing an individual's cognitive capacity.

Building on Vygotsky's ideas, Feuerstein, Rand and Hoffman (1987) suggested that learning assessment should incorporate knowledge of three interrelated components: the individual's current level of functioning, the individual's level of efficiency when approaching and completing activities, and the individual's capacity for change through meaningful interaction with more capable others.

Drawing from this perspective, researchers have begun to examine procedures which include identification of learner potential for change as an integral part of an overall assessment model. Although initially explored with intelligence evaluation, dynamic assessment procedures have been recently used to examine the reading process. Most researchers attempting to identify the zone of proximal development have presented the learner with increasingly specific hints. They have estimated learning potential by calculating the number of hints (or the degree of specificity of the hints) necessary for the learner to complete a task (Campione & Brown, 1987; Paratore & Indrisano, 1987; Pearson & Valencia, 1987; Vye, Delclos, & McGoldrick, 1988). This procedure gives a general idea of the maturation of the learner's specific abilities. It enables the examiner to differentiate between learners who have almost mastered an ability from those for whom the ability has not yet begun to develop.

Justification

Given the limitations of current static reading assessment practices (Brozo, 1990; Valencia & Pearson, 1987) and the need for teachers to understand better the strategic reading behaviors of their students, the authors have developed a dynamic assessment procedure based on the theoretical framework of Vygotsky (1978) and Feuerstein et al. (1987). Procedures used reflect the interactive nature of assessment and instruction. This approach allows an examiner to explore three interactive components:

* the reader's current level of reading
* the reader's knowledge, use, or misuse of reading strategies and the capability of dealing with varying reading tasks
* the reader's capacity for change given appropriate instruction.

Purpose of Study

In this research study, we sought to explore the value of the Dynamic Assessment Procedure for understanding reading behaviors of high school age students. In addition, we examined its usefulness in establishing an instructional program by sharing the information obtained from the DAP with the students' teachers and interviewing them about its use.

Method

Subjects

Subjects were high school age students from three different suburban schools. Fourteen were from a public high school and fifteen were from two private schools for students with reading difficulties. The public school students were referred to the reading specialist for testing because they seemed to be having difficulty reading content area materials. They represented all four grade levels in the high school, 9 to 12, and they ranged in age from 14 to 17. There were twelve boys and two girls in the group.

The students from the private schools ranged from ages 12 through 16 years. There were 10 boys and 5 girls. Neither school classified according to grade level but assigned the term "upper school" students to their older populations. One was a university affiliated laboratory school for students with learning problems, and the second was a private school for "children who have experienced reading/learning difficulties". Reading ability levels reported for these subjects ranged from pre-primer through fourth grade.

Materials

Commercially prepared informal reading inventories were used in the dynamic assessment procedure: Advanced Reading Inventory (Johns, 1981), Analytical Reading Inventory (Woods & Moe, 1989), and the Qualitative Reading Inventory (Leslie & Caldwell, 1990). Expository passages from these inventories were used. It has been suggested that there may be a difference in strategy use between narrative and expository text (Leslie, 1988). For assessment purposes, therefore, it was essential to choose one or the other and remain consistent across levels. Students in high school often experience difficulty with content area materials; therefore expository passages were used.

In addition to the assessment passages, other expository passages were used for the instruction portion of the DAP. These materials were taken from the Reading About Science series (New Readers Press, 1981) and various textbooks.

Procedures

Each subject was tested individually by the researchers using the following components of the DAP:

* initial assessment of reading ability to establish an individual reading baseline
* analysis of reading process and strategy utilization including use and misuse of known strategies and targeting of a potentially effective strategy
* presentation of a mediated learning lesson for the targeted strategy using direct instruction, guided practice and independent practice

* analysis of reader's ability to benefit from presentation of newly introduced strategy through a post-assessment with alternative form of original measure, and a comparison of test and retest measures to establish the zone of reading potential

Initial assessment

The first step in the process was to determine the individual's current level, the reading level of materials that the reader was capable of understanding without assistance. A silent informal reading inventory was given, using a slightly modified procedure.

In order to determine how prior knowledge affected comprehension, a free association task was used (Leslie, 1988). Subjects were asked what they knew about the topics before reading the passages. Their remarks were recorded and their background knowledge was classified as high, medium or low. For example, when a subject was asked about banjos, the response, "What's that?" was considered low knowledge. "I think it is something like a guitar," was a response typical of medium knowledge, indicating a general idea of the topic but no specific information. An example of high prior knowledge was, "I don't know much about them. I think they are things you play like a guitar, you know, musical instruments with strings. I think that Southerners used to play them a lot. Black people played them I think."

After these initial questions, the informal reading inventory was given. Subjects read passages silently and then answered factual, inferential, vocabulary and evaluative questions about them. Responses to questions and informal comments were recorded verbatim. Subjects were given increasingly more difficult passages until they scored 50% or less on the comprehension questions (frustration level).

Analysis of reading process and strategy utilization

The second component of the DAP was an analysis of the reader's observable strategy knowledge and use on the original inventory. Responses were analyzed in conjunction with prior knowledge statements and unsolicited comments to determine which strategies were used. All subjects' unsolicited comments and answers to comprehension questions were recorded. In addition, the researchers asked specific probes, such as "Were there any parts of the passage that weren't clear? What did you do to try to help you understand? What do you usually do when you are trying to understand a passage?" Analyses of the reader's responses indicated which strategies were used proficiently, which strategies were preferred, and which strategies were not used at all.

Subjects' responses were evaluated in conjunction with a strategy framework developed from previous research (Kletzien, in press). The strategies evident were use of background knowledge, rereading, making inferences, visualization, prediction, decoding, and comprehension monitoring. Definitions of strategies and sample responses indicating their use are presented in Table 1. To assure the reliability of the analyses, twenty percent of the transcripts were analyzed by both researchers independently. Interrater reliability was 94 percent. Disagreements were resolved through discussion.

Insert Table 1 about here

Presentation of mediated learning lesson

The third step of the assessment procedure, a mediated lesson, was used to evaluate the reader's capacity to modify reading behavior. Strategy information gleaned from the earlier steps of the assessment procedure was used to determine which strategy to target in the lesson. The strategy chosen to be taught was one which readers did not use at all, or one which they used inappropriately.

Few of the subjects in this study indicated use of visualization; therefore this was the usual targeted strategy for instruction. Researchers have shown that visualization can contribute to comprehension (Gambrell & Bales, 1986; Pressley, Goodchild, Fleet, Zajchowski & Evans, 1990; Sadoski, 1983, 1985), and time required for explanation and instruction of this strategy is relatively brief. One subject already used visualization; therefore text structure was targeted as a strategy to teach. This mediated lesson was largely unsuccessful because explaining, modeling and providing practice for this strategy is very time-consuming. Two subjects experienced difficulty in decoding; for these subjects, prediction using context for word recognition was a more appropriate strategy to target.

An explanation of strategic reading and a description of observed strategy use on the original inventory was shared with the reader. This sharing of information is an essential component of dynamic assessment. After direct instruction and modeling of the targeted strategy, guided practice was provided. Finally the reader was given an opportunity to use the strategy independently.

This part of the assessment furnished the opportunity to observe not only the reader's attempts to use the introduced reading strategy but also the behaviors associated with learning something new. Acceptance of instruction and alacrity with which the strategy was used independently was noted.

Acceptance and speed in learning were ranked as high, medium or low based on observation of subject behavior. When a student looked at the researcher as though she was crazy and did not really participate in the lesson, acceptance was rated low. Subjects who participated with the attitude that they were willing to do what was expected of them but were not really enthusiastic were ranked medium. Subjects who became excited about the lesson and requested to learn more strategies were ranked as high in acceptance. The purpose of judging acceptance was to provide the teacher with information about how resistant or open the student might be to learning something new.

The same rating was made for speed of learning. Some subjects were able to proceed on their own after only one or two paragraphs of examiner modelling and guided practice; they were rated as high in speed. Others, rated low, needed six or seven practice paragraphs and extended time before they were able to take over the new strategy. Speed of learning was reported to give teachers information about how much modelling and guided practice would be necessary before the student would be able to work independently.

Analysis of reader's strategy use following lesson

Following the mediated session, the subject was given an alternative form of the reading inventory to see whether use of the introduced strategy improved performance. An analysis of

reading behaviors provided essential information about the reader's capacity and ability to modify the reading process. The difference between the reading level obtained on the initial reading inventory and that obtained on the alternative form was designated as the reader's zone of reading potential, the range in which reading ability, given appropriate guidance, could mature.

A broad zone of reading potential, covering numerous levels, implies that a reader has many "budding" abilities which could be nurtured using materials from any level in this zone. On the other hand, a restricted zone of reading potential, covering one or two levels, indicates that a reader has fewer emerging abilities, has been less receptive to strategy instruction, and/or needs more explanation and practice to develop alternative strategies.

All of the information from the testing was analyzed and was shared with the subjects' teachers. One of the researchers gave both written and oral information to the teachers in the private schools about individual student's reading and also made suggestions about possible instructional approaches utilizing reading strategies. The other researcher worked with the students in the public school, basing instruction on the results of the DAP.

End-of-year assessment

Six months later, all subjects were given a different expository form of an informal reading inventory to determine changes in reading behavior and ability. The informal reading inventory was administered following original procedures and scoring. Teachers in the private schools were interviewed about the usefulness of the information provided by the DAP and their attempts to utilize the suggestions made by the researcher.

Results

Of the original twenty-nine subjects, five were reading on grade level and did not exhibit any particular difficulty with reading. Since the DAP's perceived usefulness is to help students and teachers identify strategies which would help readers who are having trouble, these subjects were not included in the analysis. Four of the original subjects moved and left the schools before the post-assessment, and one student was ill and unable to participate in the post-assessment. Thus, of the original twenty-nine subjects, twenty-three were given the full DAP in the fall, but only nineteen completed the study by participating in the post-assessment in the spring.

According to preliminary analysis, ten of the twenty-three subjects' baseline reading levels were between the primer and fourth grade levels, twelve were between the fifth and eighth, and one was above ninth grade. Predominant strategies identified included decoding, use of personal experience and rereading. Occasional use of other strategies, such as comprehension monitoring, predicting and inferencing were noted.

Thirteen (57%) subjects demonstrated moderate acceptance in trying a new strategy; eight (35%) were ranked as high, and two (9%) low. Speed of learning the strategy varied with eleven (48%) of the subjects ranking moderate, seven (30%) high, and five (22%) requiring extended practice time.

The subjects' zone of reading potential varied from no change in level to a change of four reading levels. Two (9%) of the subjects had a zone of four levels, two (9%) had a zone of three

levels, ten (43%) had a two-level zone, and six (26%) had a zone of only one level. Three (13%) showed no change in level.

Insert Table 2 about here

In order to examine the predictive value of the zone of reading potential (ZRP), a comparison was made between the ZRP and reading growth over the six month period (the difference between the initial level and the post-assessment level). A Pearson correlation coefficient of .71 indicates that the ZRP has predictive value ($p.<.01$) for growth in reading.

At the end of the study in May, teachers reported using the results of the DAP and suggestions provided to them at the beginning of the study. The teachers were enthusiastic about the usefulness of the information as a guide for their instruction and about their students' growth over the year. Both cooperating teachers had positive responses even though they had very different backgrounds in knowledge of reading philosophies and instructional approaches.

Analyses of particular subjects' behaviors and responses to the DAP illustrate more clearly its use and benefits than the quantitative analyses can. Two examples will be given, one from the public school and one from the university affiliated laboratory school.

Case Study 1.

Dan is a fifteen-year-old ninth grade student in the suburban high school. Before beginning the DAP, he shared the fact that he didn't like to read very much, and that he would like to learn to read better. He said that he did not read outside of school, and that he did not like to read social studies and science assignments because he did not understand them.

Dan approached the testing session with apparent ease. He was able to explain his answers and laugh at funny occurrences during the testing. Although his answers were generally short and his voice soft, he became more animated when talking about passages that he was interested in. His verbal abilities seemed average for a ninth grader, with appropriate vocabulary and sentence structure.

Analysis. Dan's word recognition for words in isolation was adequate through the tenth grade level; his only errors were in accenting the wrong syllables of words which were not in his speaking vocabulary.

During the initial informal reading inventory, Dan was successful at understanding and answering questions through the eighth grade level. His responses indicated that he was using two major strategies to understand: decoding and his ability to make inferences. For example, he was able to draw the inference that the banjo originally came from Africa because the passage said that it was made of "hide and gourd," and Dan knew that Africans used gourds. He also used his ability to make inferences by realizing that the two kinds of banjos discussed in the passage were probably tuned differently, giving them different sounds.

Dan was not aware of any strategies that he used when he was reading other than sometimes rereading if he knew that he was going to have to answer questions about something. He seemed not to monitor his comprehension nor relate specific information that he knew to answer factual questions. For example, when asked what he knew about praying mantises, he answered, "I've seen them; they're big green bugs, and you shouldn't kill them." After reading the passage, which confirmed that the males were green, Dan responded to the question about what color they were by saying "brownish."

Mediated lesson. During the mediated lesson, the researcher gave a short explanation of strategic reading. The analysis of Dan's apparent strategy use was shared with him, and the importance of developing other reading strategies was discussed. Visualization was demonstrated for him on an eighth grade passage using a think-aloud procedure. Although he said that he had never heard of or thought of visualizing before, Dan's response was very positive. On the second passage, the researcher and Dan shared their visualizations, and Dan was encouraged to develop mental images based on the actual information from the passage. By the third passage, Dan was able to visualize and share his mental images without prompting from the researcher. He was excited about his success and eager to learn more strategies.

Post-assessment. On the post assessment, Dan was successful reading ninth and tenth grade selections even though his prior knowledge of the topics was low. When answering a question about why a woman felt ugly as a child, Dan responded and then said, "I saw that." He also stated directly that he was trying to "see" what the passage was describing.

Dan's ability to learn a new strategy relatively quickly and then to modify his reading behavior showed flexibility and openness to instruction, willingness to try something new, and indicated that he could benefit from comprehension strategy instruction. His zone of reading potential was eighth to tenth grade level.

Results. During the school year, Dan received strategy instruction from the researcher once a week. Unfortunately, Dan was absent from school frequently so he didn't learn a lot of new strategies to use; however, his attitude toward strategy use and study remained positive.

On the end-of-year assessment, Dan was able to read successfully through the tenth grade level material without any supportive help from the researcher. On the eleventh grade level passage, he had difficulty with vocabulary words which he did not know and was unable to figure out from context. He mentioned as he was reading that he reread, visualized, tried to predict what questions would be asked, and kept track of whether it made sense. He said that one passage was really hard for him because it involved riding the elevator-bus and a monorail in East Boston and he didn't know enough about that to understand what it was. In general, he utilized a metacognitive approach to his reading by the end of the year, much different from his approach at the beginning.

Case Study 2

Rob, age 16, attended the university affiliated laboratory school. The school had undergone significant philosophical changes during the year, and Rob's teacher had no extensive training in reading assessment or instruction procedures. School records indicated that Rob was reading at a fourth grade level.

Rob was matter of fact in calling himself a poor reader and jokingly asked if he could "take the 5th amendment" when queried about the amount of time he read during an average week. He was more interested in talking about his outside interests and school friends than beginning another reading assessment and activity. He quite frankly indicated his avoidance behavior by persistently introducing one more new idea to prevent the start of the assessment procedure.

Analysis. His sight vocabulary was quite limited in that he reached frustration by the third level (45% accuracy). Initially, he would have difficulty with medial letters, such as man for men but quickly his word recognition deteriorated; he would use the initial letter or letters of the word and guess, for example muscles for museum.

During the initial informal reading inventory, the passage comprehension checks indicated that he was able to comprehend through the third grade level. This, however, may be quite misleading in that a significant number of text words were supplied by the researcher when Rob read the second and third level passages.

An analysis of his performance suggested that Rob attempts to use his background knowledge to make sense out of what he has read. Unfortunately, this was of limited benefit for at least two reasons. The prior knowledge assessment had indicated that Rob had limited knowledge about the targeted topics. In addition, frequently he would confuse information. One passage discussed the American Revolutionary War, but Rob consistently mistook this for the American Civil War.

When he read the initial inventory passages, he had insisted on reading orally. When faced with an unknown word, he hesitatingly attempted to use structural analysis and phonics. Quickly, however, he would stop trying on his own and request assistance.

Mediated lesson. Because Rob appeared to focus on either sounding out words or requesting assistance for decoding issues, he was unable to construct meaning from reading. Sentences were strings of known and unknown words for him. Therefore, the mediated lesson focused on using prediction/hypothesis testing as a way for Rob to extend using context as an alternative to his current decoding attempts.

During the mediated lesson, Rob was reluctant to participate in the discussion about his reading performance. He stated that everyone knew what his problem was, "You know -- reading unknown words. So what's the point of doing something different when I read?" Although his initial statements suggested low acceptance, as the lesson proceeded, Rob became more positive in his responses and involvement. Rate of learning, however, was quite low and considerable time was needed to model and guide Rob through the process of predicting what an unknown word could be based upon the information already obtained. Many paragraphs were used with Rob and the researcher alternately practicing prediction and reading further to clarify.

Post-assessment. The post-assessment immediately following the mediated lesson indicated a change of two levels, a zone of reading potential from second to fourth grade level. More importantly, Rob demonstrated how and when he used the new strategy by stating that he didn't know one of the words [mass] in the passage but that he figured out that it must mean big by what he had been reading. He laughed and said that he hadn't done that before.

Results. In order to promote a more global and interactive view of reading, it was suggested to both Rob and his teacher that he be encouraged to use prediction as a way to utilize both his available background knowledge and text to hypothesize about what a possible word could be. Other strategies suggested included schema activation and cognitive mapping to help Rob make connections between concepts presented in reading.

On the end-of-year assessment, Rob was able to read successfully through the fifth grade level without any supportive assistance from the researcher. This represented an overall change of three grade levels. Rob's teacher indicated that she focused on having Rob become more interactive with reading by using the prediction/hypothesis setting and confirming strategy. She also introduced cognitive mapping as a way to help Rob organize the concepts presented in texts.

Discussion

One purpose of this study was to determine whether the DAP could provide information about subjects' strategy use and reading behaviors. Another purpose was to determine teacher interest and ability to use DAP information to develop instructional plans. This section will focus on strategies identified, reading behaviors changed through the mediated lesson, affective responses and teacher reactions.

Strategies

The researchers were in substantial agreement on the individual strategies inferred from the subjects' comments and responses. Particularly noticeable were use, lack of use, or misuse of background knowledge, rereading, making inferences, predicting, decoding and comprehension monitoring.

The addition of the prior knowledge component informed the analysis by allowing the researchers to determine whether a subject was using background of experience to guide comprehension. This particular strategy was not used at all by some subjects who indicated that they knew particular information before they read a selection, but then answered questions about that information incorrectly even though the selection substantiated their previous knowledge. Other subjects depended so much on this strategy that they responded from their own knowledge base even though their prior information was contradicted in the selection. This understanding could not have been developed without an analysis of both the prior knowledge statements and the question responses.

The initial prior knowledge assessment also made it possible to determine when and how subjects were utilizing their experience to make inferences from the reading. Some subjects seemed to look for connections between what they were reading and what they knew. In their unsolicited comments and in their responses to questions, they often expressed their understanding by saying that they "guessed" because of something else they knew that was similar.

Many subjects commented that they reread when they were trying to understand and remember information. This strategy is effective for most readers because rereading can help a reader regain understanding. One subject in this study commented that she did sometimes reread but not usually because she thought that she was not "supposed to." She was relieved when she was told that rereading was not only permissible; it was even necessary for almost all readers.

Comprehension monitoring, closely allied to rereading, was evident for some of the subjects in the study. Occasionally they would express their lack of understanding as they were reading by shaking their heads and saying, "This doesn't make sense." More often, they would respond to the questions by saying, "I really didn't understand that part as I was reading it." Few of the subjects indicated that they knew what to do when they perceived a lack of understanding. A few of the subjects stated that they didn't understand because of the difficulty of the words.

Predicting was usually evident in unsolicited comments. Subjects would say, "I thought it would say that," or "I knew that you would ask that question." Thus, their predictions were either what the passage would be about or what the questions would be. Either prediction can be an effective strategy for readers who must read and remember information.

Reading behavior change

Another important element of the DAP, not evident in quantitative data, was the difference in the quality of responses after the mediated lesson. Often, even if the ZRP did not reflect great growth, subjects elaborated on responses and gave evidence of greater understanding of passages. Where initially subjects had presented a cut and dry response, after the strategy had been introduced, the responses were presented in more detail. One subject provided his own analogy of a moving over-crowded school bus to explain the concept of inertia. Although the answer was only partially correct, the reader had to have understood the basic concept presented in order to develop his own analogy.

Several students demonstrated remarkable agility with using visualization. They spontaneously discussed their mental images as they presented their comprehension responses. Unfortunately, although their reported mental pictures were vivid, their comprehension level did not change quantitatively.

Trying to learn and use strategies occasionally had a negative effect. Reading rate occasionally decreased. When questioned, subjects reported that they needed time to really make good pictures of what they were reading. For some subjects, trying to use the newly introduced strategy seemed to require a conscious application of energy that detracted from their remembering the passage. For these readers, practice of the strategy until it becomes automatic will be necessary.

Affective response

One of the most important elements of the assessment, again not apparent in the quantitative data, was the interest in learning which most subjects showed during the mediated lesson. Making the subject an active participant, pointing out the strategies which the subject was using, and explaining that there were other strategies which could be used seemed to give the subjects greater confidence and a sense of control over what was happening. Many of the subjects became excited about learning something different and requested that they have a chance to learn more strategies.

Each reader approached the mediated lesson with individual spirit. The private school students had long histories of severe reading disability and were disinclined to risk themselves further. Even so, each of them showed remarkable endorsement during the mediated lesson. No one refused, and even the most cynical seemed pleased with learning something new. As one

student said to the researcher, "I thought this would be just more of the same stupid stuff but you know I really did see that stuff the writer wanted me to see. Maybe, I'll try it when I get back to the class."

This interest in learning from students who have not had a lot of success in reading can not be underestimated. A new approach to reading, such as use of strategies, may be motivating to these students who have generally failed to learn through other methods. Among the students who participated in the pilot study for this procedure, the sense of participation, control and the chance to try something new seemed to be contributing factors in their willingness to continue to work on reading improvement.

Teacher response

Another purpose of this research was to determine whether the information would be valuable to teachers in planning an instructional program for the students. When this information was shared with the participating teachers, they were enthusiastic about the reading strategy information that they gained, and they appreciated having additional data about students' responses to instruction. They utilized the DAP results in planning their instruction.

Because of the difference between the cooperating teachers in their background knowledge of reading, it was surprising when both teachers provided similar positive reports about the beneficial nature of the DAP's immediate reader information and the suggestions for instruction based upon the data. The researchers were unsure about how much instructional follow through the less reading-experienced teacher would be able to do. Offers for support during the year were made, but neither cooperating teacher requested assistance. Yet, at the end of the year both teachers commented that these offers made them feel more secure.

Nancy, a reading specialist and classroom teacher at the independent school, had had some experience with a strategic approach to reading. She indicated that she introduced and modeled the suggested reading strategies across the curriculum. The strategy was introduced and modeled during the listening to literature component of class and then directly followed up in a least two of the following curricular areas: literature, science or social studies. Nancy stated that she focused on developing the students' awareness and use of prediction, text structure for narrative and expository materials, and comprehension monitoring, utilizing a modified reciprocal teaching procedure.

When questioned about the information provided to her, she responded that the learner/reader behavior was "right on target. I had these students last year so I already knew the information. But a teacher getting a new class in the beginning of the year would need and use this information. The assessment of the motivational issues was on target for the readers."

Nancy added that she felt that even though some of the students might not have shown a significant change in level during the year, that "the quality of their comprehension changed dramatically within levels."

Mari, the teacher in the other cooperating school, indicated that reading was not her real area of strength. The strategic reading concepts were new to her, but she was open to exploring anything that would help her with her students. She summarized the utility of the DAP information

by indicating that it provided about "80% instructional guidance for the class. By the end of the year, they were all reading. It made them enjoy it. They were reading different types of materials."

Mari indicated that she used the instructional strategies suggested by the researcher to plan for the different students. For those students with severe decoding issues she "emphasized key vocabulary rather than word identification. We emphasized the finality [the global meaning] and concepts rather than the identification of the words."

Her comments about the information provided about the students were positive. "It helped me to understand some of the kids better. I really didn't know them. When I saw that Rob was turning you off during the DAP, I realized that he was probably turning me off. I let him work more independently then, and we used the prediction/hypothesis setting to move beyond the decoding problems." She further indicated that she felt that the DAP information helped to strengthen her rapport with her students. "I used the information so that we worked together."

Limitations

Limitations in any research study need to be recognized openly. In this particular study, the most outstanding limitation may also be the most outstanding strength: the relationship between the examiner and the test taker is crucial to the success of the DAP. The researchers were able to develop good rapport with the subjects in the study; without this good relationship, the procedure might not have been effective. It is possible that the subjects' ability to use the modelled strategy was as much a part of their willingness to cooperate with the researcher as it was a reflection of their ability to change reading behaviors (P. N. Winograd, personal communication, October 1, 1990).

Another limitation of the study relates to the strategy that was chosen for instruction. For most of the subjects, visualization was used because they did not indicate that they were already using it, and because research has indicated that it is useful in improving comprehension. However, it may be that visualization is more valuable for some readers than for others because of differences in learning styles and preferences. It may also be more useful for some passages than for others. Had other strategies been taught, subjects might have shown different patterns in growth.

An additional concern is that strategy use was inferred from readers' responses to questions about the passages, solicited explanations of reading behaviors, and spontaneous comments. Inferences made on observable behavior and self-report data may be questionable; however, such techniques are supported by Afflerbach and Johnston (1984) who indicate that, "Used appropriately, verbal reports offer a unique, if sometimes less than transparent, window for viewing cognitive processes" (p. 320).

Other limitations result from the lack of strict reliability of informal reading inventories (Helgren-Lempesis & Mangrum, 1986), and from the possibility that practice reading passages and answering questions resulted in a broader zone of reading potential than was justified.

Conclusions

The DAP is particularly valuable for at-risk readers because it provides a means of understanding readers' strengths, weaknesses, preferred strategies, and ability to accept and apply

new strategies. Subjects in the study responded favorably to having an active role in the assessment. Sharing with them information about which strategies they were using and then suggesting and modeling another seemed to give them greater confidence and a sense of control. The relationship between the examiner and the subject was essential to the success of the procedure.

Using the DAP requires firm knowledge of reading strategies for analyzing reader performance. Although acquiring this knowledge may be initially demanding for the examiner, the wealth of diagnostic and instructional information obtained about an individual's reading ability, strategy use and instructional receptiveness makes this procedure valuable for planning and instruction.

The DAP provided essential information for the cooperating teachers who were planning instructional programs for the subjects of the study. All three teachers were able to utilize the strategy information to identify which strategies to teach, and they were able to use the behavioral information to guide their work with particular students.

Further research using the DAP with other age groups is necessary to know whether the procedure is effective with younger children. The DAP should also be tested with narrative passages since different strategies may be appropriate when reading narrative materials. It is also important to train others to do the testing to see whether they achieve the same results as the researchers.

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Table 1 - Strategy Classification Scheme

Strategy	Definition	Sample Responses
Previous knowledge or background of experience	Use of prior knowledge to guide comprehension	"They're green; I've seen them before." "Comets form tails that point away from the sun." [information not included in passage].
Rereading	Going back to reread sections of text	"I had to read that again." This strategy also sometimes evident by observation and reading time.
Inferences	Using what the text states and what the reader knows to understand.	"They must have dressed neatly because their hair was swinging so that means it was clean, and you don't have clean hair and dress sloppily."
Visualization	Using mental pictures to understand and recall text.	"I could see what happened; that was the picture I got." Sometimes this strategy was evident from subjects' gesturing or reenacting how a procedure was done in a selection.
Prediction	Making a guess as to what will happen.	"I thought that would be what happened." "I knew you would ask that question."
Decoding	Recognizing words	"I had a little trouble with that word, but I figured it out." This strategy was more obvious when it failed, i.e. "I couldn't figure out what that word was."
Comprehension Monitoring	Awareness of understanding or not understanding passage	"I didn't understand that; I had to read it again." "This one was dumb. I didn't know what it was talking about."

Table 2 - DAP Results

Subject	Initial Level	Speed of Learning	Rate of Acceptance	Zone of Reading Potential	Final Level
1	5	M	M	5-9	9
2	8	M	M	8-9	10
3	8	H	H	8-10	10
4	8	L	M	8	9
5	4	M	M	4-7	8
6	6	M	H	6-7	10
7	8	M	M	8-9	Moved
8	10	H	H	10-12	Moved
9	8	M	M	8-10	Moved
10	3	L	L	3-4	5
11	2	M	H	2-6	6
12	3	M	M	3-5	5
13	2	L	M	2-4	6
14	3	M	M	3-5	6
15	1	M	M	1-3	3
16	6	H	H	6-7	7
17	2	H	H	2-4	4
18	P	L	M	P-2	2
19	6	M	M	6	Moved
20	6	H	H	6-8	6
21	5	H	M	5-8	9
22	6	H	H	6-7	6
23	1	L	L	1	1